CLAIMS

What is claimed is:

1. A partial gear bearing, comprising:

an upper half, comprising a plurality of first gear teeth and a first integrated roller surface having a first roller surface radius, the first roller surface being disposed between the outwardly extending gear teeth, and

a lower half, comprising a plurality of second gear teeth and a second integrated roller surface having a second roller surface radius, the second roller surface being disposed between the inwardly extending gear teeth,

wherein the first and second roller surface radii are equal.

2. A partial gear bearing according to the limitations of Claim 1, wherein the upper and lower halves of the partial gear bearing are offset.

3. A partial gear bearing according to the limitations of Claim 2, wherein the first gear teeth and the second gear teeth are out of phase with each other, such that each first gear tooth aligns with a portion of the second roller surface, and each second gear tooth aligns with a portion of the first roller surface.

4. A partial gear bearing according to the limitations of Claim 1, further comprising an axis of rotation about which the partial gear bearing rotates and wherein both the first and second gear teeth are aligned at a right angle to the axis of rotation.

5. A partial gear bearing according to the limitations of Claim 1, further comprising an axis of rotation about which the partial gear bearing rotates and wherein both the first and second gear teeth are aligned at an angle diagonal to the axis of rotation.

6. A partial gear bearing according to the limitations of Claim 1, wherein the first gear teeth include a pitch radius, which is substantially equal to the first roller surface radius.

7. A partial gear bearing according to the limitations of Claim 1, wherein the second gear teeth include a pitch radius, which is substantially equal to the second roller surface radius.

8. A partial gear bearing according to the limitations of Claim 1, further comprising an axis of rotation about which the partial gear bearing rotates and wherein the first gear teeth extend radially outwardly from the axis of rotation to form peak teeth.

9. A partial gear bearing according to the limitations of Claim 1, further comprising an axis of rotation about which the partial gear bearing rotates and wherein the second gear teeth extend radially inwardly from the axis of rotation to form valley teeth.

10. A system of partial gear bearings, comprising:

a first interacting partial gear bearing, comprising a plurality of first outwardly extending gear teeth and a first integrated roller surface, the first roller surface being disposed between the first outwardly extending gear teeth, and

a second interacting partial gear bearing, comprising a plurality of first radially inwardly extending gear teeth and a second integrated roller surface, the second roller surface disposed between the first inwardly extending gear teeth,

wherein the first and second partial gear bearings interact with each other such that alternately during rotation of the partial gear bearings the first and second roller surfaces contact each other and the first outwardly extending gear teeth mesh with the first inwardly extending gear teeth.

11. A system of partial gear bearings according to the limitations of Claim 10, wherein the first partial gear bearing further comprises a plurality of second radially inwardly extending gear teeth and a third integrated roller surface disposed between the second inwardly extending gear teeth, and the second partial gear bearing further comprises a plurality of second radially outwardly extending gear teeth and a fourth integrated roller surface disposed between the second outwardly extending gear teeth, wherein the first and second partial gear bearings interact with each other such that alternately during rotation of the partial gear bearings the third and fourth roller surfaces contact each other and the second outwardly extending gear teeth mesh with the second inwardly extending gear teeth.

12. A system of partial gear bearings according to the limitations of Claim 11, wherein the first outwardly extending gear teeth are offset from the second inwardly extending gear teeth.

13. A system of partial gear bearings according to the limitations of Claim 11, wherein the first inwardly extending gear teeth are offset from the second outwardly extending gear teeth.

14. A system of partial gear bearings according to the limitations of Claim 11, wherein the first and second partial gear bearings interact with each other such that alternately during rotation of the partial gear bearings the third and fourth and integrated roller surfaces contact each other and the second outwardly extending gear teeth mesh with the second inwardly extending gear teeth.

15. A system of partial gear bearings according to the limitations of Claim 10, wherein the system is a planetary transmission, including a sun partial gear bearing, a plurality of planet partial gear bearings and a ring partial gear bearing.

16. A system of partial gear bearings according to the limitations of Claim 15, wherein anti-backlash operation is provided by preloading the planets.

17. A system of partial gear bearings according to the limitations of Claim 16, wherein some of the planets are preloaded to provide anti-backlash clockwise motions.

18. A system of partial gear bearings according to the limitations of Claim 16, wherein some of the planets are preloaded to provide anti-backlash counterclockwise motions.